ATOMIC ENERGY

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Dear Sir:

Some sections of the Savannah River Plant have started operations, and others will be starting up at frequent intervals, according to Gordon Dean, USAEC Chairman. Mr. Dean, who was testifying recently before a House of Representatives Appropriations sub-committee, concerning the USAEC's 1954 budget, said that more than $200 million would go for projects associated with thermo-nuclear objectives, such as the Savannah River Plant, where materials for the thermo-nuclear ("hydrogen bomb") program are to be produced. In discussing the new gaseous diffusion plant at Paducah, Ky., Mr. Dean stated that operations there had already given uranium-235 production a substantial increase, and that additional capacity there will be coming onstream over the next few months. At Hanford Plutonium Works, Hanford, Wash., he observed that in plutonium production the latest plant additions there are outperforming the older equipment. Concerning storage sites for nuclear weapons which have been produced and assembled, Brig. Gen. K.E. Fields told the sub-committee that the budget included more than $30 million for new storage sites for such weapons. He said that underground storage sites built with previous funds already were being filled.

An analysis of the 1954 budget for the U. S. atomic energy program (as approved by Congressional sub-committee) shows that some $423,938,000 is to be spent for raw materials; $87,750,000 for nuclear reactor development; $38,900,000 for physical research; and $6,565,000 for biology and medicine. While this represents less than the original amount that had been requested by the USEAC for its operations, it is the largest such budget to date. Contemplated expenditures for the year total $2.4 billion, much of it from past appropriations, and principally to continue the expansion of nuclear facilities in the U. S.

Pointing out that the technology of nuclear power production is inextricably mixed with the technology of producing the materials from which atomic bombs are made, Henry D. Smyth, USAEC Commissioner, recently told a Case Institute of Technology audience that it will be difficult to split the atomic energy industry in two parts, labeling one for military purposes and keeping it under government control, and labeling the other for civilian purposes and releasing it to private industry. He emphasized, however, that the reasons for considering a change in the present methods of operation are "compelling". Such reasons are threefold, he noted. First, he said, is the inherent long-range weakness of any monopoly, that is, the lack of continuing competitive stimulus; second, the inherent difficulty of running a large industry directly under government supervision; and third, the increasing interest in uranium as a potential source of commercial power.

Results of research on processes for concentrating low-grade uranium ores (such as occur in Saskatchewan), were revealed recently at the annual conference of the Chemical Institute of Canada, in Windsor. The research, done at the University of Saskatchewan, indicates that it may be possible to concentrate low-grade uranium ores by flotation.

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BUSINESS NEWS...in the nuclear field...

PLANT FOR NUCLEAR POWER PROPOSED- A plant for the production of atomic power, without substantial Federal subsidy or guarantee, to be built by a private group, was a proposal recently made to the Joint Congressional Committee on Atomic Energy in Washington. The Committee, which has been considering in closed session various proposals to change the Atomic Energy Act to permit private individuals or corporations to enter into atomic power programs, made the proposal public last week. The proposal, made by Walker L. Cisler, president, Detroit Edison Co., and John J. Glebe, Dow Chemical Co., with the two companies acting jointly in such a venture, would involve development of a nuclear reactor (of the breeder type) capable of producing plutonium as well as the heat energy which would be utilized for electric power production. Mr. Cisler told the Committee that his group had sufficient capital for the venture and would require no Federal commitment to buy the plutonium.

OFFERS TO CONSTRUCT NUCLEAR POWER PLANT FOR PRIVATE CONCERN- North American Aviation, which has been doing nuclear research under a USAEC contract for some years, revealed at a press conference in the last fortnight that it is ready to construct a nuclear power plant for any firm which desires such a plant. North American stated that it has designed a pilot plant for the production of 8000 kilowatts of electric power by uranium fission. Such a plant would require about two years to construct, the firm stated, and would cost an estimated $10 million. A full-scale plant, capable of generating about 200,000 kilowatts, would cost approximately $50 million. No plans have been made for actual construction of such a plant, North American emphasized; further, a spokesman, pointed out, North American is not in the business of selling electric power, nor does it intend to enter the field. The firm is, however, ready to work with industry or an industry-government combination on this project, to make atomic power generators practical for those who are in the business of supplying electric energy. As demonstrated in broad outline (and in a scale model), the proposed plant would generate heat by the fission of uranium-235. Solid uranium metal would be used, which would contain somewhat more than the customary 0.7% of uranium-235 found in unenriched uranium. Heat from the reactor would be picked up by a circulating stream of a molten metal such as sodium or bismuth. Then, this heat would be transferred to a conventional water boiler. The evolved steam would activate a turbine-generator, which would produce the electric power. It was proposed to run the reactor at approximately 1000 deg. F.

INDUSTRIAL POTENTIAL OF ATOMIC ENERGY BEING DEMONSTRATED- In what is believed to be its first "face-to-face" explanation to the business community of what atomic energy (and its by-products) are capable of doing, the USAEC has an exhibit at the first Exposition of Basic Materials for Industry, now being held in New York (June 16-19, inclusive). The accompanying conference on Basic Materials is also hearing an address on "Materials and the Atomic Age" by a USAEC specialist.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

The Physician in Atomic Defense, by T. P. Sears. For the physician: the structure of the atom, significance of radioactivity, chain reactions, the atomic bomb, the use of isotopes, and a brief review of physical concepts of matter. Covers pathology and treatment of atomic bomb injuries, and methods of civil defense. 308 pages. -- Year Book Publishers, Inc., Chicago 11, Ill. ($6.00)

Identification and Qualitative Chemical Analysis of Minerals, by O. C. Smith. 2nd Ed. While not a major part of this text, the chapter on Geiger counter methods for the location of radioactive minerals in the field, and the standard methods for the qualitative analysis of uranium and other radioactive elements in ores, make this book of interest. 385 pages. -- MacMillan & Co., New York. ($8, approx.)

Dosimetery of Ionizing Radiations by Means of Color Centers in Sensitized Alkaline-Earth Salts. Results of a study by staff of Naval Research Laboratory, Washington, of certain crystalline materials which change color when exposed to gamma rays. This report covers the theory of such color changes, and describes how to produce a rod or bar of plastic impregnated with strontium sulphate, which turns purple when subjected to gamma radiation. 19 pages. Mimeographed.--Office of Technical Services, Dep't of Commerce, Washington 25, D. C. (50¢)

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

FROM THE MANUFACTURERS- Model E-50 radioactive current source, consisting basically of three parts: a source of beta particles in the form of a radioisotope attached to an electrode which becomes the anode; an adjacent electrode which collects these emitted beta particles or high speed electrons; and a solid insulator which allows penetration of the high speed beta particles but prohibits any reverse flow of low energy particles. The manufacturer points out that the insulation is the critical feature of the source, since both physical and electrical properties of the insulators are degraded by nuclear radiation, and that research conducted by him has developed a method of treating plastic to provide high volume resistivity under radiation. Further, that this plastic under prolonged radiation has not lost any appreciable tensile strength. It is pointed out that various isotopes can be used when different battery life is desired. The most convenient isotope so far is strontium-90, which occurs relatively abundantly in the fission process and consequently is available in large quantities. Applications suggested include as a dosimeter charger; to calibrate electrometers; to test insulation; and for other purposes. --Radiation Research Corp., West Palm Beach, Fla.

Disposable plastic radioactivity measuring cups, molded from cellulose acetate. Offered in six sizes, from 15/16" in diameter, with a depth of 5/16", to 1-13/16" in diameter with a depth of 1/8". Said to be capable of being dried slowly under heat lamps without distortion of the plastic.--Falge Engineering Corp., Bethesda 14, Md.

New three curie high intensity shielding container for the shipping and storing of cobalt-60 radiography or other sources. This new source container is constructed of 4 3/4" of lead plus 3/8" of malleable iron. The lead filling, plus the iron outer surface, provides shielding which is the equivalent of 5" of lead. The radiation from a three curie cobalt-60 source, when enclosed in the container, is said to be less than 10 mr/hr at one meter. The container is approximately 10 3/4" diameter, 13" high, and weighs 270-lbs.--Tracerlab, Inc., Boston 10, Mass.

NOTES:- An automatic system which controls the rate of power generation of a nuclear reactor by regulating the reactor's control rods is now being offered by the Industrial Div. of Minneapolis-Honeywell Regulator Co. The firm states that this is the first system to provide such control.

RAW MATERIALS...radioactive minerals for nuclear work...

UNITED STATES- Idaho- The Sunshine Mining Co. has reportedly developed uranium ore in its silver mine at Kellogg. The uranium mineralization is uraninite, ocurring in the footwall of the Sunshine vein from the 2900 level to the bottom 3700 level, according to a company geologist.

Oklahoma- A large number of uranium leases are now under active exploration by Kerr-McGee Oil Co., Oklahoma City. Approximately 900,000 acres of land in northeastern Wyoming are now under active exploration by Kerr-McGee. Currently, airborne scintillometers are being flown over the area.

CANADA- A two year production program to cost some $7-$8 million is planned for Gunnar Gold Mines, president G. A. LaBine recently told the annual meeting of the company. He said that it was felt the size of the uranium zone warrants installation of a 750-ton mill. Gross value of the ore was estimated at approximately $30 per ton. Milling costs will be about $7 to $8 per ton, with a 90% recovery, the firm's metallurgical engineer told the meeting. While he made no overall tonnage estimate, Mr LaBine intimated that sufficient uranium ore was indicated to supply the mill for ten years. He also observed that it would be several years before it would be necessary to go underground as a large section of the orebody can be mined by open pit methods.....Described by the firm as its best pitchblende find yet made is a recent showing by Iso Uranium Mines in a new section of its property several hundred feet from the boundary of Gunnar Gold Mines, which it adjoins, in the St. Mary's Channel area. Six occurrences have been found in this immediate area, each described as showing strong radioactivity. One of the fractures shows three inches of massive pitchblende. The new area far exceeds anything yet located with regard to the size and strength of the cross fractures carrying the pitchblende, the company's resident engineer has stated.....At Rexspar Uranium & Metal Mining Co. diamond drilling has been resumed; plans call for approximately 5,000-ft. of exploratory work at the property which is approximately 70 miles north of Kamloops, B. C.

NUCLEAR ENERGY & ECONOMIC POWER: A condensation of remarks by Gordon Dean, Chairman, USAEC, before Edison Electric Institute meeting, Atlantic City, N. J., June 4, 1953.

There seems to be no doubt that economically feasible power from the atom can be achieved. The only doubt that exists are questions of "when" and "how". Scientists and technicians have clear ideas on what must be done. But policy makers have not yet laid down the rules under which it will be done.

Therefore we are at a crossroads in the matter of atomic power policy. As background, here are some technical milestones passed in arriving at this crossroads.

First there was the initial successful operation of a nuclear chain reactor Dec. 2, 1942. The second was the first successful production of useful atomic power, accomplished Dec., 1951, with the experimental breeder reactor at the Arco, Idaho, reactor testing station. The third milestone were the encouraging reports turned into the USAEC by the four industrial study teams who had been examining the status of the USAEC's reactor development program for about a year. Fourth was when the prototype of the first atomic power plant for submarine propulsion began operating at the Arco station. This is a significant reactor, for it is the first one specifically designed to produce useful atomic power for the purpose of producing steam to turn a propeller shaft.

And now I have the great pleasure to announce that we have reached still another milestone in the history of atomic energy development in the Unites Sates. It is atomic "breeding"--a development which holds out the promise of making a civilian atomic power industry even more feasible and attractive in the long range than it has hitherto appeared to be.

I now have word that Dr. Zinn, Dr. Lichtenberger, and their colleagues at Argonne National Laboratory, Chicago, have used the Argonne-built experimental breeder reactor, at Arco, Idaho, to demonstate, successfully, this principle of breeding. The reactor is operating in such a way that it is burning up uranium-235, and, in the process, it is changing non-fissionable uranium into fissionable plutonium at a rate that is at least equal to the rate at which the uranium-235 is being consumed.

The real significance of breeding is that it is now possible for us ultimately to utilize all of the uranium that can be extracted from the earth's surface for atomic fuel, whether it is fissionable or not in its natural state. And the proof of success in breeding at the Arco station suggests, in addition, that the other potential atomic fuel, thorium, may also ultimately be utilized. (Thorium, however, was not used in this particular experiment, and I do not wish to imply that its susceptibility to breeding has been proved.)

Having passed these technical milestones, the last remaining technical obstacle is to learn to build atomic power plants so cheaply that the power they produce will be competitive with that from conventional fuels.

Therefore the policy problem that faces us is to determine how this cost-cutting job can best be done. We feel that to accomplish this the Atomic Energy Act (1946) be amended to permit: (1) The ownership and operation of nuclear power facilities by groups rather than the USAEC; (2) The lease or sale of fissionable material under proper safeguards; (3) The use and transfer of fissionable or by-product materials by the owners of reactors, subject to purchase or regulation by the USAEC.

As part of its policy position, the USAEC has also proposed that these suggested changes in the law be accompanied by adjustments in the USAEC's own practices to permit: (1) The granting of more liberal patent rights in accordance with law, (2) A more liberalized information policy in the power reactor field, and (3) The performance in USAEC laboratories of such research and development work in the power field as is deemed warranted in the national interest.

I have noted with considerable interest and some disappointment that a few people have already labled these policy recommendations "the atomic giveaway program". This is simply not true. Actually, there is only one place where any real rights of the government are at issue in the development of atomic power, and that is in the matter of patents. In this regard, I think there are two objectives: (1) No one should be allowed to come into the atomic power picture with the investment of a dollar or two and walk off with patents worth hundreds of millions, and (2) Those coming into the power program and making a contribution of talent and money involving a real risk should be entitled to some patent rights denied to others.

ATOMIC PATENT DIGEST...latest U. S. grants in the nuclear field...

Torque compensated galvanometer. A fluxmeter comprising in part a galvanometer having a stationary permanent magnet field and a coil mounted for angular deflection about its axis from a zero point within this field, with means torsionally suspending this coil and establishing a restoring torque proportional to the angle of displacement of the coil from its zero position. A photocell, light source and mirror arrangement permit measurement, within the scope of the apparatus, of a current deflecting the coil from its zero position. U.S. Pat. No. 2,640,866 issued June 2, 1953; assigned to United States of America (USAEC). (Inventor: W.M. Powell.)

Accelerator target. A method of producing an intense divergent X-ray beam. Comprises (in part) electrostatically accelerating an electron beam, constraining this beam to traverse an orbital path of substantially constant radius during this acceleration, and by this and other means producing the intense divergent X-ray beam. U.S. Pat. No. 2,640,924 issued June 2, 1953; assigned to United States of America (USAEC). (Inventor: E. M. McMillan.)

Mass spectrometer control. In mass spectrometer operating means (in part) an envelope enclosing spectrometer elements, and an ionization pressure gauge, means for supplying electrical energy to the spectrometer elements, and means for energizing the pressure gauge, a gaseous discharge tube, with means for impressing on the control grid of this tube a voltage corresponding to the pressure at which this gauge is subjected, and associated circuitry. U.S. Pat. No. 2,640,935 issued June 2, 1953; assigned to United States of America (USAEC). (Inventor: S. B. Spracklen.)

Method and apparatus for indicating the movement of material. Apparatus for obtaining information about material moving in a predetermined path. Comprises (in part) means spaced from this path and out of contact with this material for creating radioactive isotopes in a confined region of this material as it passes a first point in its path, and means for detecting radiation from these isotopes as they pass a second point in this path. Registering means are provided for measuring the time displacement between the creation of the isotopes and the detection of the radiation. Utilizing the result obtained by this measurement, the rate of movement of the material is determined. U.S. Pat. No. 2,640,936 issued June 2, 1953 to Wolf S. Pajes, New York, N. Y.

Protector from the radiant energy of an atomic explosion. Comprises (in part) a foldable blanket incorporating material impervious to such radiant energy, and a cover fastened to the marginal portion of the blanket at one end, and intermediate the side edges of the blanket. This cover comprises pairs of opposed flaps extending in directions transversely and longitudinally of the blanket, respectively, with each of the flaps having three free edges and being foldable about the blanket when folded to envelop the blanket. U.S. Pat. No. 2,640,937 issued June 2, 1953 to Kenneth J. D. Munday, Boston, Mass.

Utilizing a beam of high energy electrons in sterilization and in therapy. Apparatus for sterilizing (i.e. irradiating) by the action of high-energy electrons masses of substances such as foods, drugs, medical and surgical supplies, cosmetics, packaging materials, etc., containing organisms to be destroyed by the action of a beam of high-energy electrons, and for use in cathode-ray therapy of malignant growths. Comprises (in part) means for creating and directing a beam of high energy electrons, these means including a high-vacuum acceleration tube-like envelope internally along which such beam of high-energy electrons is transmitted from its emanating source. From this envelope the beam of high-energy electrons may be discharged into such respective substances for sterilizing. This high-vacuum envelope has a high-energy electron-beam exit "window" which is completely permeable to electrons without any loss of electron energy. This exit "window" for the electrons is in open communication with the outer atmosphere. Means are provided to prevent impairment of the degree of vacuum in this main chamber, and to maintain as near a perfect vacuum as is customary in usual acceleration tubes, notwithstanding this unclosed exit opening. U.S. Pat. No. 2,640,948 issued June 2, 1953; assigned to High Voltage Engineering Corp., Cambridge, Mass. (Inventor: E. A. Burrill.)

Sincerely,

The Staff,
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